

EX PARTE OR LATE FILED

April 13, 1994



Building The
Wireless Future...

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W. Room 222
Washington, D.C. 20554

RECEIVED
CTIA

APR 13 1994

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

~~DOCKETED~~ FEDERAL COMMUNICATIONS COMMISSION
~~OFFICE OF THE SECRETARY~~

Cellular
Telecommunications
Industry Association
1250 Connecticut
Avenue, N.W.
Suite 200
Washington, D.C. 20036
202-785-0081 Telephone
202-785-0721 Fax

Dear Mr. Caton:

On Wednesday, April 13, 1994, in light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, the Cellular Telecommunications Industry Association ("CTIA") sent the attached letter, and report entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*, to the FCC staff listed below.

Daniel Abeyta
Rudy Baca
Beverly Baker
Andrew Barrett
Thomas Beers
Lauren Belvin
James Bennett
Karen Brinkmann
Kelly Cameron
John Cimko
Rodney Small
Jonathan Cohen
Diane Cornell
Brian Fontes
Bruce Franca
David Furth
Donald Gips
Bart Gorman
Sheldon Guttman
Ralph Haller
Reed Hundt
Stevenson Kaminer
Michael Katz
Bill Kennard
Kimberly King
Julia Kogan
Evan Kwerel

Blair Levin
Kathy Levitz
Renee Licht
Byron Marchant
Steve Markendorff
Roland Martin
Geraldine Matise
Maura McGowan
Ruth Milkman
Tom Mooring
Kent Nakamura
Myron Peck
Dr. Robert Pepper
James Quello
David Reed
Jill Ross-Meltzer
Greg Rosston
Sarah Siedman
David Siddall
Richard Smith
David Solomon
Thomas Spavins
Merrill Spiegel
Dr. Tom Stanley
Gerald Vaughan

Mr. Caton
April 13, 1994
Page 2

If there are any questions in this regard, please contact the undersigned.

Sincerely,



Robert F. Roche

Enclosure



Building The
Wireless Future

April 13, 1994

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Commissioner Andrew C. Barrett
Federal Communications Commission
1919 M Street, N.W. Room 826
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Commissioner Barrett:

In light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, I enclose a report prepared for the Cellular Telecommunications Industry Association ("CTIA") entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*.

This report reviews a representative sampling of studies and predictions about the wireless industry, derived from analysts, consultants, and would-be PCS providers.

The report reveals that both *analysts and would-be providers practically speak with a single voice when they urge the Commission to act with dispatch* in resolving outstanding issues and licensing the PCS spectrum.

The report also makes it clear that *PCS is many different things to many different people*. It is in light of these different visions of PCS that different results are predicted and different recommendations made.

In going forward, the Commission should be mindful of this fact, and adhere to its own considered decision to define PCS broadly, leaving it to the marketplace to validate the ultimate results.

If there are any questions in this regard, please contact the undersigned.

Sincerely,

Robert F. Roche
Director for Research

Enclosure



Building The
Wireless Future

April 13, 1994

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Chairman Reed Hundt
Federal Communications Commission
1919 M Street, N.W. Room 814
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Chairman Hundt:

In light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, I enclose a report prepared for the Cellular Telecommunications Industry Association ("CTIA") entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*.

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April 13, 1994

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Commissioner James H. Quello
Federal Communications Commission
1919 M Street, N.W. Room 802
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Commissioner Quello:

In light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, I enclose a report prepared for the Cellular Telecommunications Industry Association ("CTIA") entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*.

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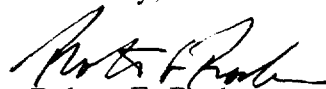
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Director for Research

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April 13, 1994

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Mr. Gerald P. Vaughn
Deputy Chief, Common Carrier Bureau
Federal Communications Commission
1919 M Street, N.W. - Room 500
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Mr. Vaughn:

In light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, I enclose a report prepared for the Cellular Telecommunications Industry Association ("CTIA") entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*.

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Dr. Thomas Stanley
Chief Engineer
Federal Communications Commission
2025 M Street, N.W. - Room 7002
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Dr. Stanley:

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Mr. Ralph A. Haller
Chief, Private Radio Bureau
Federal Communications Commission
2025 M Street, N.W. - Room 5002
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Mr. Haller:

In light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, I enclose a report prepared for the Cellular Telecommunications Industry Association ("CTIA") entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*.

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Ms. Julia Kogan
Private Radio Bureau
Federal Communications Commission
2025 M Street, N.W. - Room 5202
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Ms. Kogan:

In light of recent interest in information on Personal Communications Services (PCS) demand, and related issues, I enclose a report prepared for the Cellular Telecommunications Industry Association ("CTIA") entitled *PCS Predictions and Perspectives: Highlights of 32 Studies and Reports On Prospects for PCS*.

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Dr. Robert Pepper
Chief, Office of Plans & Policy
Federal Communications Commission
1919 M Street, N.W. - Room 822
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Dr. Pepper:

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Mr. Michael Katz
Chief Economist, Office of Plans & Policy
Federal Communications Commission
1919 M Street, N.W. - Room 822
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Mr. Katz:

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Mr. Donald Gips
Deputy Chief, Office of Plans & Policy
Federal Communications Commission
1919 M Street, N.W. - Room 822
Washington, D.C. 20554

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GEN Docket No. 90-314
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Robert F. Roche
Director for Research

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Building The
Wireless Future..

April 13, 1994

Mr. Gregory Rosston
Telecommunications Specialist
Office of Plans & Policy
Federal Communications Commission
1919 M Street, N.W. - Room 822
Washington, D.C. 20554

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BUILDING THE WIRELESS FUTURE

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APR 13 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

PCS Predictions and Prescriptions:

**Highlights from 32 Studies and Reports
On the Prospects for PCS**

by

Robert F. Roche

Director for Research,

Cellular Telecommunications Industry Association

This report summarizes a representative sampling of studies and predictions about the wireless industry, ranging from definitions of personal communications services (PCS), through market-size and market-share predictions, to observations about the bases for wireless competition.

These studies and the parties to the proceeding practically ***speak with a single voice when they urge the Commission to act with dispatch*** in order to avoid an unwarranted and debilitating delay in submitting the various visions of PCS to the true and final judge -- the user.

It is equally clear from these studies that ***PCS is many different things to many different people***. Thus, definitions of success, and recommendations of what the proper predicates are for those results, vary from case to case.

The Commission has rightly exercised a healthy agnosticism over what PCS may be, in adopting its broad and flexible definition of the term. It should not undermine that considered approach, nor the prospective viability and vitality of that industry, by trying to impose through regulation a singular vision of PCS.

The Wireless Study Round-Up: Comparing Expectations and Predictions

This report draws upon consultant, analyst and service provider studies in order to address the following questions and issues:

- How Do You Define PCS? (p.1)
- How Large Will the Wireless Market Be? (p.4)
- Projected Market Shares of Different Wireless Services (p.8)
- Supply/Demand Substitution in Services (p.14)
- How Will the Services Compete? - Positioning (p.18)
- How Will the Services Compete? - Pricing (p.21)
- How Will the Services Compete? - Exploiting Infrastructure (p.25)
- Specialized Markets - Data and Niche Applications (p.27)
- When Will PCS Arrive? (p.28)
- A Sampling of PCS Trial Results (p.30)

The studies, public statements and reports which are the basis of this chapter describe the relationship between wireless services, including cellular, personal communications services (PCS), enhanced specialized mobile radio (ESMR), paging and other wireless services. Some of these reports include revenue and subscriber projections over the next decade. The results of various PCS trials are incorporated where they address the issues listed below, and are abstracted in the appendix to this chapter. ***CTIA's analysis and commentary on each section is bolded and italicized in order to provide for ease of reference.***

How Do You Define PCS?

PCS is a fluid term. The Federal Communication Commission (FCC) -- exercising a healthy agnosticism -- has declared that it is "radio communications that encompass mobile and ancillary fixed communication services that provide services to individuals and businesses and can be integrated with a variety of competing networks."¹

Many analysts and providers have likewise exercised a healthy flexibility in defining PCS, defining the term broadly. Of course, fine distinctions may yet be drawn in the marketplace -- but that will be done on the basis of customer and provider applications and relationships.

What is most important is recognizing that the vision of PCS held by any one analyst or provider must be and will be subordinated to the judgment of the consumer, who may make no such fine distinctions between the underlying cellular, ESMR, paging, PCS, or specialized mobile radio (SMR) provider.

¹Second Report and Order, Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, 8 FCC Rcd. 7700 at 7713 paragraph 24. (October 22, 1993).

As John T. Stupka, President and CEO of Southwestern Bell Mobile Systems (SWB Mobile Systems) has observed: "The person who desires wireless service wants to be able to place and receive calls anytime, anywhere, with reasonable cost and with acceptable quality. For the most part, these people tend to have little concern about the underlying complexities of the technology."² In fact, they are probably equally indifferent as to *what* company provides the service, whether it is one which used to be called a cable, cellular, ESMR, "local phone," "long distance," paging, or SMR company. What the consumer is interested in is service.

Admittedly, different analysts see demand for PCS developing differently -- for example, differing over whether it will initially develop as a business or consumer market. That question, and the viability of the market plans which would-be providers have developed, will be ultimately tested by the actual operations of the market.

Cowen & Company

A report issued by Geoffrey Johnson, of Cowen & Company, in January 1993, on "Industry Strategies, Wireless Communications Industry," observed that the vision of PCS held by various players depended upon their competitive position.

For the cellular industry, cellular is PCN, and the key issue is interoperability. For the local exchange carriers, PCN is an adjunct to the network, and the key issue is integration. For the interexchange long distance carriers, PCN is bypass for the local loop, and the key issue is local access. For new market entrants, PCN is competition to cellular and landline service, and the key issue is cost.³

The Freedonia Group

The Freedonia Group, in its study "Wireless Phones," projects that "PCS will initially be targeted at business/professional users, whose need for the type of high-level integrated voice/data communications capability PCS offers is greatest. By early in the next century, however, as the subscriber base expands and equipment prices and service costs decline, a substantial consumer market for PCS will emerge, attracted by the services' convenience, economy and safety/security advantages."⁴

²"Tracking the Pervasive Wireless Communications Technologies of the Future," *Wireless Communications Forum*, March 1994, at p.32.

³"Industry Strategies, Wireless Communications Industry," Quoted in "Players and Promises in PCS," *Business Communications Review*, April 1993.

⁴"Wireless Phones," *Wireless Communications Forum*, March 1994, at p.82.

Grantchester Securities

This may also be contrasted with the definition offered by Richard Bilotti and Drew Hanson of Grantchester Securities:

We view . . . PCS as wireless communications in the "subscriber's environment of the moment," be it in the home, the office, a shopping center, airport, post office or sports arena -- in short -- universal coverage. We have assumed that PCS will work under a pedestrian mobility scenario though vehicular mobility will be possible with modification to the network. Either type of portability means a personal telephone unit that is quite compact, lightweight, and with sufficient technical capabilities to operate over the envisioned wireless environment. . . . Within this broad landscape, cable operators may choose to play a variety of roles in the provision of PCS services.⁵

PCIA

The Personal Communications Industry Association's (PCIA) *1994 PCS Market Demand Forecast* defines PCS "as a broad range of individualized telecommunications services that enable people or devices to communicate independent of location."⁶

SWB Mobile

John T. Stupka, President & CEO of Southwestern Bell Mobile Systems, has said that PCS services are "nothing more than cellular services offered on a different frequency."⁷

Technology Futures Inc.

Ralph Lenz, senior consultant at Technology Futures, was quoted in *Cellular Sales & Marketing* as dismissing distinctions between PCS and cellular: "What's the difference between cellular and PCN/PCS? Users don't care. To the user, personal communications is a small, lightweight handset. The user could care less about the network technology as long as it delivers tetherless service at a reasonable price."⁸

⁵"The Cable Approach to the PCS Landscape," *Wireless Communications Forum*, December 1993, at p.53.

⁶*PCIA Bulletin*, February 4, 1994, at pp.6-7.

⁷ Paul Shultz, "Is There Really a Significant Difference Between Broadband PCS and Cellular Technology?" *TR Wireless News*, December 2, 1993, at pp.16-17.

⁸*Cellular Sales & Marketing*, November 1993, at p.7.

U S WEST NewVector

John DeFeo of U S WEST NewVector Group describes PCS as "a personal voice and data communication that will be inexpensive, provide portability and weeks of battery life with a small, easy-to-use handset. New PCS will take on a multitude of faces; in some iterations, it will take on the face of enhanced cellular and will be built off the big cell structure of cellular. In other iterations, it will look more like CT2 -- with the emphasis on many low-power microcells. . . . New PCS will address a variety of segments -- in terms of auto mobility, it will act like cellular. It will also provide outstanding in-building service and enhanced portability for pedestrians. It has the advantage, as well, of serving as a wireless local loop."⁹

The Yankee Group

The Yankee Group has distinguished between PCN, which it describes as "the cordless microcellular market," and PCS, which it uses to refer to the "broad wireless mobile market."¹⁰

Mark Lowenstein of the Yankee Group has also said "There will be two types of PCS: 1) niche services, which will be provided through a small regional network or in a city; 2) larger, regional types of service, which will take a tremendous amount of capital. Players such as MCI will partner extensively. Those with the deep pockets are the likeliest to survive Therefore we believe few new faces will be offering PCS; many large, existing service providers will be in the PCS game, and not too many new entrants."¹¹

It is clear from these studies that PCS is many different things to many different people -- it is interpreted as local loop bypass, as competition to cellular and landline services, as an adjunct to the wired network, and a myriad of as-yet undefined applications. Thus, definitions of success, and recommendations of what the proper predicates are for those results, vary from case to case.

How Large Will The Wireless Market Be?

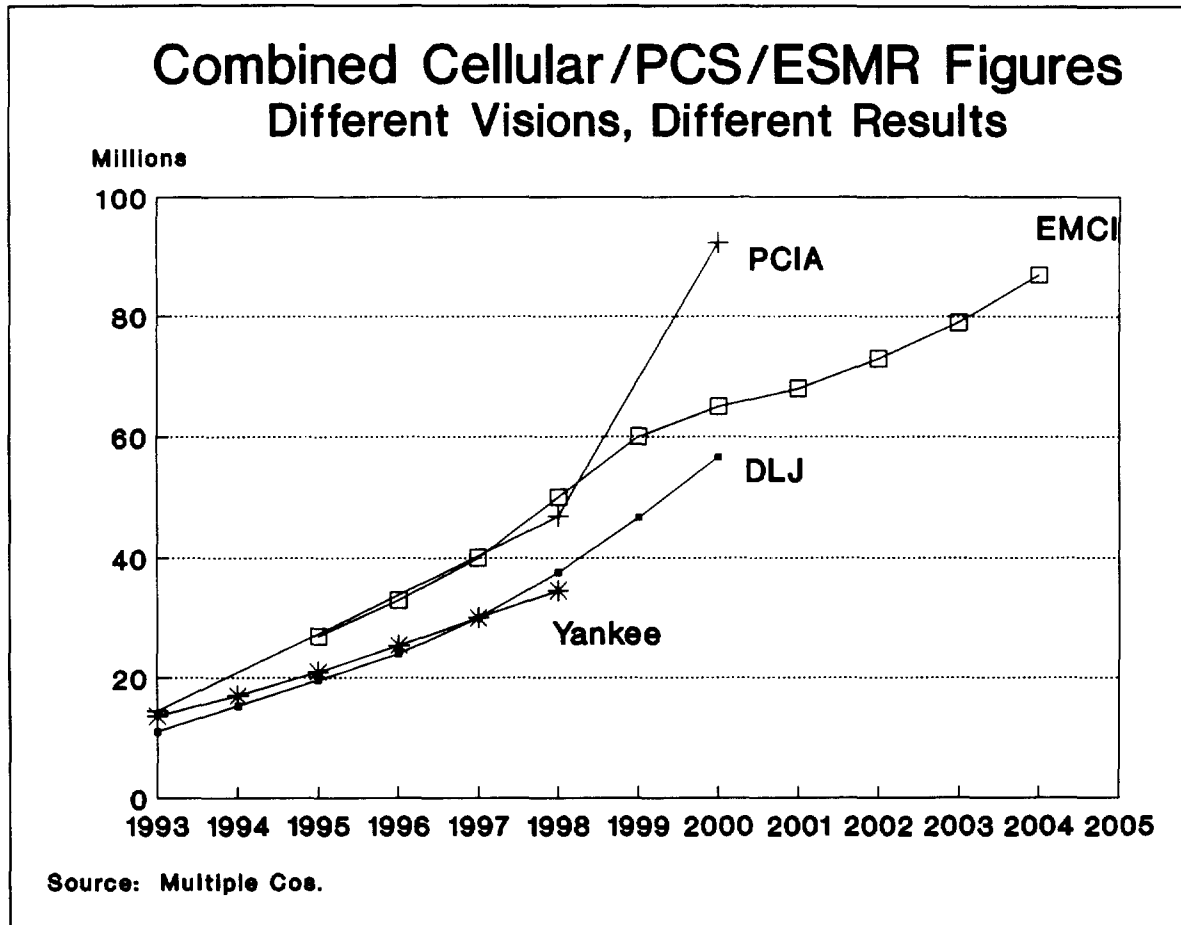
Every analyst and participating company declares that the wireless market is growing by leaps and bounds. That is evident from every study from every source.

⁹"The PCS Challenge: Opportunities for Cellular Carriers in Tomorrow's Wireless Marketplace," *Wireless Communications Forum*, March 1994, at p.25.

¹⁰"Digital Cellular and Personal Communications Services," *Wireless Communications Forum*, July 1993, at p.62.

¹¹ "PCS News' Special Survey: Executives Preview PCS' Future," *PCS News*, January 20, 1994, at p.7.

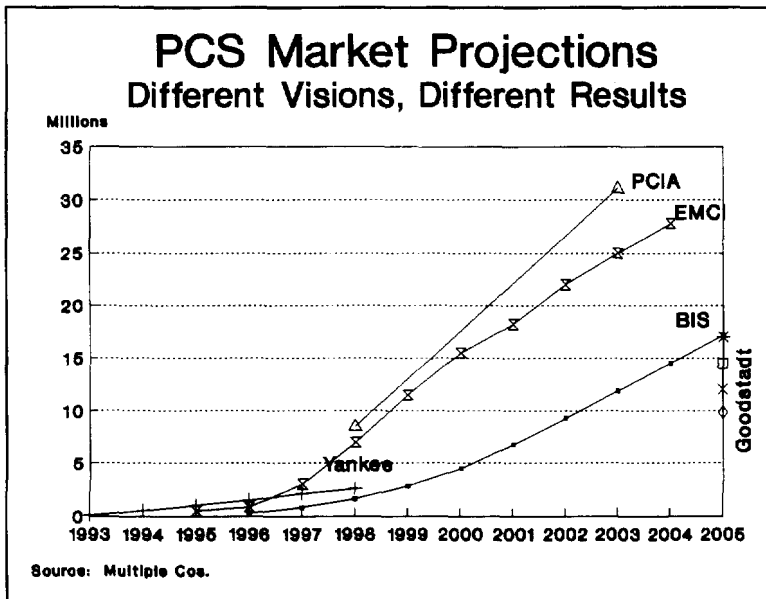
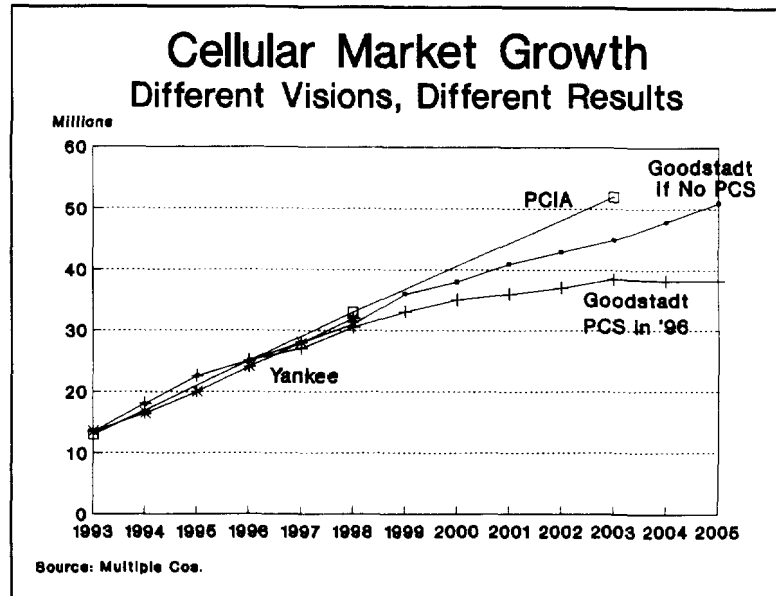
The reports which attempt to estimate overall market growth are dealt with in this section, and simple review indicates that they are "all over the map." This is true both for service-specific projections, as well as for projections of overall mobile service subscribership -- in fact, there is as much variation between the combined market projections as between the service-specific projections.



Logically, this result is inevitable. Because PCS is so broadly defined, and because existing mobile services are increasingly converging in their capabilities and costs, projecting service-specific growth is subject to wide variances depending upon the assumptions used in deriving the projections.

Likewise, while overall market growth may be projected, it too is subject to variance depending on the assumptions used. Thus, as the above chart indicates, Donaldson, Lufkin & Jenrette projects 56.5 million combined cellular/ESMR/PCS users in 2000, compared with Economic and Management Consultants International projections of about 60 million combined users. (The Yankee Group projections stop in 1998, and even in that year omit SMR/ESMR services.)

And comparison of studies which seek to provide service-specific projections indicates a broad spread between those projections. Thus, PCIA projects PCS subscribership in 1998 of 2.6 million, compared with the Yankee Group projection of 8.55 million. And in later years, a range between 12 million and 17 million are offered by Barry Goodstadt, depending on the date of roll-out.



But CTIA prefers to remain agnostic about such projections. The true test of PCS, and of all other wireless services, will come in the marketplace. Historians and industry observers may look back and marvel at how we under- (or over-) estimated the demand which the public really harbored for these individual mobile services, or that we failed to project the growth of some as-yet unimagined application.

Columbia PCS Inc./Columbia Capital

Steve Zecola, President and CEO of Columbia PCS, has stated that "Consumers throughout the U.S. are both consistent and insistent in their demand for communications mobility -- whether it be voice, information delivery or data retrieval. Consumer demand for communications mobility will grow from 15 million customers today to 60 million by the turn of the century with new features such as a single phone number per person for life becoming commonplace."¹²

¹²"Columbia Capital Forms PCS Service Venture; Steven Zecola Named President and CEO," *PR Newswire*, February 15, 1994.

Donaldson, Lufkin & Jenrette Projections

Donaldson, Lufkin & Jenrette's Winter 1994 report on *The Wireless Communications Industry* includes its "Basic Penetration Model" for the U.S. cellular industry, projecting subscribership through the year 2000. However, the model now includes PCN and ESMR. The model projects growth from 11 million subscribers as of year-end 1992 to 56.6 million in the year 2000, rising from 5.98 percent penetration to 25.18 percent penetration.¹³

	1993	1994	1995	1996	1997	1998	1999	2000
Subs. (000)	11,033	15,300	19,600	24,100	30,100	37,600	46,600	56,600

Source: Donaldson, Lufkin & Jenrette, Winter 1994 *The Wireless Communications Industry*, Table 4.

Mercer Management Projections

A Mercer Management Consulting Inc. survey's findings indicate that PCS "and other wireless services could be used by up to 36 percent of the U.S. population over the next 10 years, and that wireless eventually will replace much of today's wireline telephone service as people 'cut the cord' at home and at work."¹⁴

According to *PCS News*, the Mercer study estimated that cellular and PCS would grow to be a \$ 25 billion market during the next ten years. The interview portions of the survey indicated that the 30 experts expected build-out to occur quickly in the MTAs in order to recover investment costs, capture market share, and combat cellular preemption. The expectation was that in most MTAs service will be provided to at least 10 percent of the population within two years, and to 25 percent of the population within four years.¹⁵

Technology Futures Inc. Projections

Technology Futures, Inc., of Austin, TX, has projected 38 million PCS/cellular subscribers by 2001 in their report on *Personal Communications: Perspectives, Forecasts and Impacts*.¹⁶

¹³ Donaldson, Lufkin & Jenrette, *The Wireless Communications Industry*, Winter 1994, Table 4 at p.12.

¹⁴ *Mercer Management News Release*, February 8, 1994.

¹⁵ *Id.* at p.3.

¹⁶ "Recent PCS Studies: From Auction Strategies to Market Projections," *PCS News*, January 6, 1994, at p.10.

Market Shares of Wireless Services

The real issue being debated seems to be who is growing, and by how much. Both those reports which attempt to develop service-specific estimates, and estimates which have been advanced in connection with special pleading for manipulation of the rules governing who can participate in PCS, are dealt with in the following section.

Action Information Services

Action Information Services (AIS) has forecast 17 million PCS subscribers by 2005, and annual industry revenues of almost \$ 8 billion. According to RCR, the AIS forecast projects a shift in urban service revenues between cellular, PCS, and paging from 81 percent, 1 percent and 18 percent in 1995 to 62 percent, 29 percent and nine percent in 2005.¹⁷ According to one report, the study author indicated that "Unless PCS is rolled out soon, . . . the cellular industry, which signed up 4.9 million new subscribers in 1993 to give it more than 16 million for the year, will capture much of the middle-income mass market that PCS has targeted."¹⁸

AT&T

Joie Pacifico, AT&T PCS unit director of marketing, has projected that there will be 20 million PCS subscribers by the year 2000.¹⁹

BIS Strategic Decisions' Projections

A BIS Strategic Decisions' presentation, at the *Datacomm '93 Fall* trade show held in Washington, D.C., in December 1993, stated that the total market for mobile communications services was about \$ 10.3 billion in 1992, with 20 percent of the market being paging, and one percent being data, the remainder being voice applications. (Given that cellular revenues amounted to \$ 7.8 million in 1992, that would appear to allocate \$2 billion to paging, and \$ 100 million to mobile data.)²⁰

BIS Vice President William Ablondi forecasted that the total market would grow to about \$ 25 billion by 1993, with about 4 percent of the market being paging, about 20 percent being data, and the remainder voice applications. BIS projected that by

¹⁷"Another PCS of the Pie," *RCR*, March 28, 1994, at p.1.

¹⁸"PCS Delay is 'a killer,' says new market study," *RCR.newsfax*, April 5, 1994.

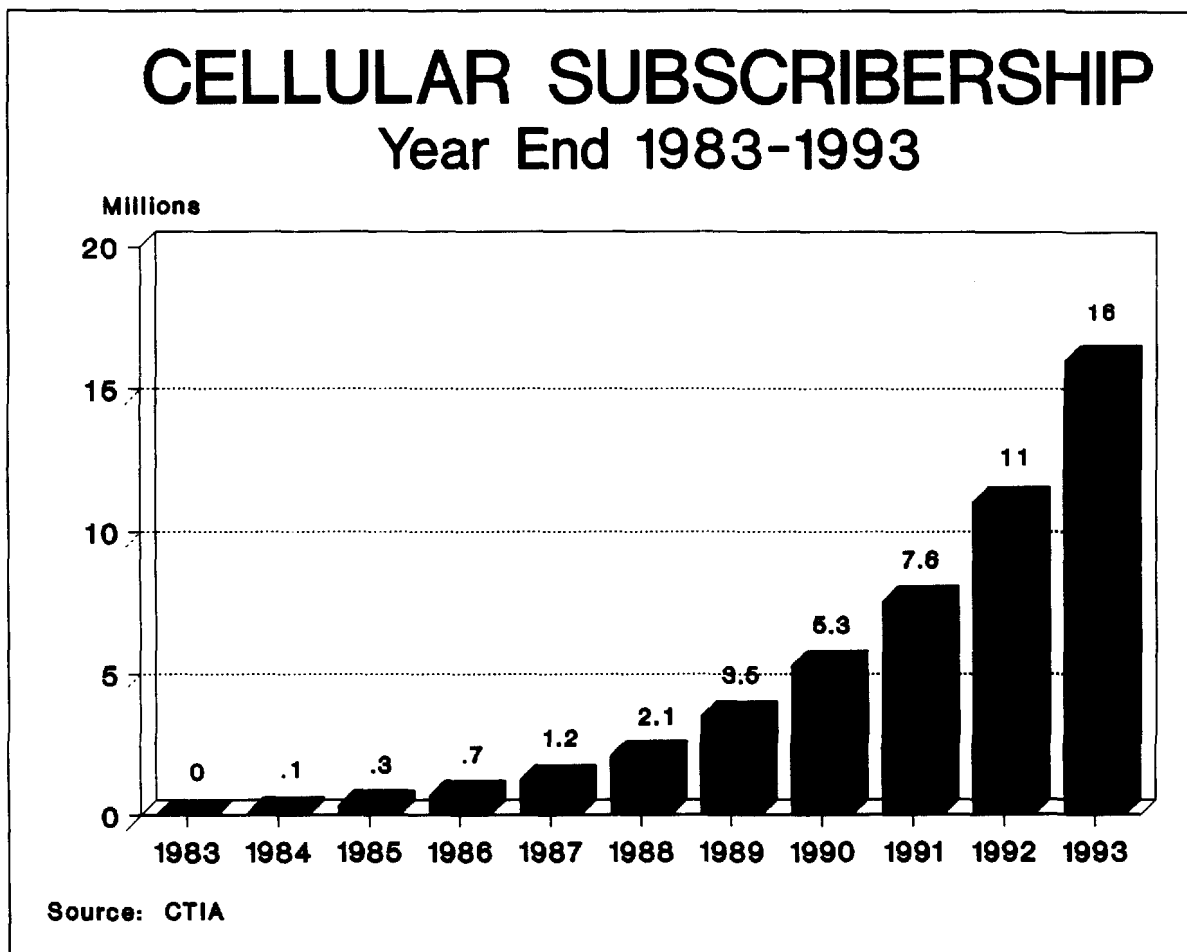
¹⁹"The Personal Touch," *The Economist*, October 23, 1993.

²⁰Total cellular revenue figure derived from CTIA's *Semi-Annual Data Survey*, December 1992, released March 2, 1993. See CTIA News Release "Cellular Subscribers Grew 46 % in 1992 Total More Than 11 Million," March 2, 1993.

the year 2000, about 14 million Americans will be actual users of Personal Digital Assistants (PDAs), out of a potential base of 42 million prospective users.²¹

Cellular Telecommunications Industry Association

CTIA does not ordinarily project growth -- preferring to track current, measurable figures. CTIA's Semi-Annual Data Survey, which has traditionally polled cellular service providers, has over time shown that cellular has experienced annual subscriber growth rates between 36 and 44 percent.



Such rates have consistently exceeded expectations, and indicate a consumer acceptance of wireless services both broader and deeper than anticipated. Indeed, CTIA itself is agnostic over demand projections, reality so often varying from expectations, preferring to observe what does develop in the marketplace.

²¹ *Cellular Sales & Marketing*, December 1993, at pp.2-3.

Donaldson, Lufkin & Jenrette Projections

The annual Donaldson, Lufkin & Jenrette report projects that the share of PCS/PCN in the year 2000 will be 20 percent of the total wireless market. DLJ also notes an American Mobile Telecommunications Association (AMTA)/EMCI projection that SMR/ESMR will grow from 1.5 million subscribers in 1993 to 4.4 million subscribers by 1998.²²

DLJ has also reported EMCI and Motorola estimates for paging units. EMCI estimated there were 18.7 million paging units in service as of year end 1993, and projects that there will be between 26.7-33.3 million in service by year end 1997. Motorola, by contrast, estimates that there will be 30 million paging terminals in service by year end 1997.²³

Northern Business Information

Northern Business Information (NBI) has projected that within five years of PCS introduction, out of 98 million telephone households in the U.S., 68 percent will own cordless telephones, that one quarter of those wireless homes will also own a cellular phone, and that altogether nearly 18 percent of telephone households will own a cellular phone.²⁴

NBI estimates that 42 percent of such cordless homes will be potential PCS subscribers. Of the total universe of households, 15 percent will be potential PCS subscribers, 15 percent will be unreachable, and 70 percent will be "non-PCS" users.²⁵

PCIA Projections

In announcing the results of PCIA's *1994 PCS Market Demand Forecast*, Tom Stroup, then head of PCIA, described PCS as complementing rather than replacing existing technologies, and stated that the 2 GHz PCS services (referred to as "New PCS") "will be heavily oriented to consumer service. Results show that business penetration for New PCS in [1998] is a modest 30%, suggesting that New PCS will not necessarily follow the traditional pattern of business to consumer migration."²⁶

²² Donaldson, Lufkin & Jenrette, *The Wireless Communications Industry*, Winter 1994, at p.22.

²³ *Id.* at p.23.

²⁴ "Cooperation & Demand," *Wireless Communications Forum*, July 1993, at p.46.

²⁵ *Id.*

²⁶ "Telocator Changes Name to PCIA, Releases Forecast on PCS Markets," *TR Wireless News*, February 10, 1994, at pp.10-11.